ATOMIC ENERGY letter

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Dear Sir:

A total of $947,970,000.00 for the U.S. atomic program in fiscal 1951 was allowed last week by the House Appropriations Committee in Washington. It was a reduction by some $95 million of the original budget requests of the Atomic Energy Commission. Meanwhile, a total of $12,439,300.00 was approved by the House Armed Services Committee for the Special Weapons Project (atomic weapons) of the Department of Defense.

"Slip casting" of ceramics; synthesizing labeled codeine; notes on the Scintillation Counter Symposium (June, 1949, at Oak Ridge); and other useful data are in 69 atomic energy laboratory reports now available. (See: Publications, page 4 this LETTER.)

Nuclear energy to power aircraft was described last week to the Cleveland meeting of the Institute of Aeronautical Sciences by Andrew Kalitinsky, chief engineer, Nuclear Energy for Propulsion of Aircraft project, at Oak Ridge. He said at least four ways of using nuclear energy for that purpose are known to be workable: the closed-cycle turbine (in which steam is generated); the turbo-jet; the ram-jet; and the rocket. Simplest of the group to adapt to nuclear energy is the turbo-jet. The chief change (he said) is to remove the combustion chamber of the conventional turbo-jet, and replace it with a nuclear reactor. While this poses problems in high temperature, he believes they are not insuperable from the metallurgical standpoint.

Problems in the design and application of radiation instruments were discussed last week by representatives of the United Kingdom, United States, and Canada, at the Canadian Chalk River atomic energy establishment. Of especial interest was the reliability of electronic equipment used for such apparatus. The conference is part of the Technical Cooperation Program of the three nations, which has been underway for the past several years.

Ionizing radiation accidentally released during plutonium or uranium-235 production, or during other atomic energy activities, will be monitored by teams of AEC or contractor people specially trained under simulated emergency conditions. The 12-man teams will be set up at 18 different locations in the U.S. where atomic activity is concentrated. (They will also provide emergency service in the event of an atomic weapon attack.) To supplement existing stocks of the radiation instruments which the teams will use, approximately 3,000 new instruments of various types are being bought by the AEC.

Discovery of element 98, named Californium, has been made at the University of California, Berkeley. Researchers who reported the discovery are Dr. Stanley G. Thompson, Kenneth Street, Jr., Albert Ghiorso, and Dr. Glenn T. Seaborg. The new element was made by bombarding a curium target in the University's 60-inch Crocker cyclotron.

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AT THE ATOMIC CITIES AND CENTERS IN THE UNITED STATES....

ARCO, Idaho- Major permanent power facilities for the nuclear reactor testing station here are to be designed by Gibbs & Hill, Inc., New York, under a negotiated lump-sum contract recently awarded that firm by the AEC. The work will embrace the design of a central substation, high-voltage distribution lines, and individual substations at the nuclear reactors under construction or scheduled for erection here. The re-design of the present Scoville substation will also be done. The AEC said its Idaho contract board considered 51 firms before recommending Gibbs & Hill on a basis of general qualifications and availability. Construction cost of the electrical work is estimated at $1 million.

General progress is marked here. The experimental breeder reactor is scheduled for completion about the end of this year. For the materials testing reactor, on which field engineering is now being done, it is expected that ground will be broken in April. On the Naval reactor (land-based prototype of a ship propulsion reactor), engineering is now underway, and site development should begin this summer. In addition, design work will begin this Spring on a chemical separation plant for nuclear fuel recovery and decontamination. Construction will be undertaken later in the year.

RICHLAND, Washington- Work is now underway here on a new water circulating system to one of the Hanford plutonium reactors. To cost $24,964,000.00, it will allow a step-up in plutonium output...A $54,000,000.00 facility, scheduled for the plutonium works here, has been completely cancelled. A new technological development has enabled the work, which the plant was to accomplish, to be done in another facility...The construction of twelve large underground steel-lined concrete tanks, two underground wooden cribs, a large concrete storage basin, and miscellaneous fittings, will be let out on bids by General Electric Co. (Hanford contract operator). The work will take about a year.

OAK RIDGE, Tennessee- The expansion program here will call upon the Tennessee Valley Authority for a continuing increase in electrical energy. As sections of the new uranium-235 production units are completed, they will be put into service; only limiting factor is the availability of electrical power. These increased requirements call for 360,000 kilowatts beginning in September, 1951, and increasing to the full requirement of 640,000 kilowatts by July, 1952. TVA will spend $7,000,000.00 to meet these demands. Approximately $1.5 millions will be to begin the 4th steam unit in the New Johnsonville steam plant, with $4.5 millions for two units in a new steam plant at Widow's Creek, in north Alabama. The remainder of $1 million is for terminal facilities, etc., in connection with the new installations. Total installed capacity of these facilities would be 337,500 kilowatts; balance of power comes from other TVA capacity.

LOS ALAMOS, New Mexico- Reflecting the increased tempo in nuclear research activities, a considerable portion of the Scientific Laboratories here have gone onto a six-day work week. About 2,000 persons are now employed by the laboratories, which, as the U.S.'s atomic weapons research center, do research and development on such thermo-nuclear devices as the fusion (hydrogen) bomb.

IMPORTANT NEW UNITS FOR ATOMIC ENERGY ACTIVITIES...in the U. S....

The new $5,000,000.00 heavy water production plant for present activities of the U. S. atomic energy program is to use the low temperature distillation of extremely large volumes of hydrogen. Although final site selection has not yet been made, it will probably be located adjacent to, or on the property of, a large synthetic ammonia or synthetic fuel plant where major quantities of hydrogen are available as off gases, and can be used as feed for the heavy water plant. (There are now about 20 synthetic ammonia plants in the U. S.) Principal items of equipment needed to construct the plant include large reciprocating type compressors; hydrogen gas expansion turbines to provide refrigeration; reversing type heat exchangers; and a large primary distillation aluminum tower and smaller secondary tower. A preliminary design study has been made by Hydrocarbon Research, Inc., New York.

RADIATION DETECTION INSTRUMENTS for civil defense purposes should be simply operated survey meters, the AEC's John A. Derry told the civil defense hearings of the Joint Congressional Committee on Atomic Energy in Washington last week. A development model of what the AEC wants such an instrument to embody was shown to the Committee. It is a high-level radiation survey instrument, using a halogen-filled Geiger tube designed by Amperex Electronic Products Co., of Brooklyn, which delivers between 50 to 100 times the current output of conventional tubes. Powered by three 1½-volt flashlight batteries, the instrument weighs slightly under 2½-lbs. The present laboratory model consists of two parallel aluminum cylinders, one for the batteries and the other with the working parts. Earphones and meter are used for measurement. The meter reads directly in r/hr., from 0 to 5.0 r. Dial readings of intensities as low as 0.5 r/hr. are possible, it was claimed, and with earphones lower intensities can be detected. Proposals on this instrument have been solicited from a large group of instrument manufacturers, the AEC said.

THE GROWTH OF THE NUCLEONICS INSTRUMENTS INDUSTRY was commented upon by Mr. Derry (above). He said that in 1947 there were nine companies manufacturing and selling 19 different types of instruments. Today, he declared, there are 44 companies manufacturing and selling 146 different types of complete instruments and 15 additional companies manufacturing accessories and components. Annual gross sales of such instruments, he stated, now amount to about $5,000,000.00.

FROM THE MANUFACTURERS- Nuclear model 172 "Ultra Scaler" does Geiger, proportional or scintillation counting, by predetermined count, predetermined time, or manual methods, plus monitoring with a probe. Two inputs, one for Geiger pulses and the other for very small proportional pulses requiring linear amplification. Higginbotham-type scale of 128 with resolution time of two microseconds.--Nuclear Instrument & Chemical Co., Chicago 10.

Consisting of a special combination of scales used only in the field of radioactivity, a new special circular slide rule, the "Nuclearule", gives, with simple settings, count rate, statistical error, coincidence loss, activity of sample versus half-life, radiation flux after passage through absorbers, and other data.--Nuclear Instrument & Chemical Co., Chicago 10.

A new miniature high-voltage power supply provides up to 2,500 volts from two 1½-volt flashlight cells. Manufacturer states especially designed for portable Geiger counter equipment.--Eltron, Inc., Jackson, Michigan.

ATOMIC PATENT DIGEST...latest U.S. & British applications & grants...

GREAT BRITAIN- Radioactive metal products and method of manufacturing them. Brit. Pat. No. 636,538; complete specifications accepted from U.S. Radium Corp.

UNITED STATES- Ion generator. A magnetic field, with a tubular anode parallel to the field, has a pair of cathodes adjacent the open ends of this anode, and an arcuate electrode inside of and concentric with the anode. U.S. Pat. No. 2,499,289, issued Feb. 28th, 1950, to J. G. Backus, and assigned to the United States of America (USAEC).

Heating element. To be used in a boiler for a vacuum pump. U.S. Pat. No. 2,499,645, issued March 7th, 1950, to Dwight L. Hopper, and assigned by mesne patent to the United States of America (USAEC).

Air proportional counter. Proportional counter apparatus using air at atmospheric pressure as its ionizing medium. U.S. Pat. No. 2,499,830, issued Mar. 7th, 1950, to E. W. Molloy, and assigned to the United States of America (USAEC).

Preparing uranium hexachloride. An oxide of uranium is reacted with a gaseous mixture of chlorine and carbon tetrachloride at an elevated temperature. U.S. Pat. No. 2,499,836, issued Mar. 7th, 1950, to H. G. Reiber and assigned to the United States of America (USAEC).

High speed mercury diffusion pump. Improvements in multi-stage, down-jet, mercury diffusion pumps, consisting of chimney changes. U.S. Pat. No. 2,499,839, issued Mar. 7th, 1950, to G. R. Stoltenberg, and assigned to the United States of America (USAEC).

study has been made by Hydrocarbon Research, Inc., New York.

ATOMIC ENERGY WORK ABROAD...

FRANCE- The nuclear reactor at Chatillon, descriptively named Z.O.E. (Z for zero output; O for oxide of uranium; and E for eau lorde), and which went into operation the end of 1948 after 16 months work, develops 5 kilowatts only. However, because of its reduced bulk, the radiation intensity achieved is nearly equivalent to higher-powered graphite piles such as the British GLEEP, at Harwell. A larger reactor, in which a higher radiation intensity will, it is hoped, be achieved, is being built at a new atomic energy center at Saclay, 12 miles from Paris. Two accelerators, one a cyclotron and the other an electrostatic machine, are now under construction at Saclay, as well. In related activities, the uranium factory has been equipped for the extraction of plutonium which is produced in the pile. Mining projects are pressed on, at the radioactive mineral deposits in the southwest of France. Now, the Commissariat a l'Energie Atomique is acting more and more as an information center on matters not necessarily connected with atomic energy, but on which experience has been accumulated. Some of the techniques, in atomic energy work, had not otherwise been studied in France. Examples are high-vacuum techniques, and powder metallurgy.

BELGIUM- The work of the Inter-University Institute of Nuclear Physics of Belgium, at its Brussels center, has been directed toward photographic plate techniques and cosmic rays, separation of isotopes by thermo-diffusion, and biological studies of the nucleotides of ribonucleic acid with radioisotopes. At its Ghent center, an automatic Wilson chamber has been constructed, while the diffusion of neutrons and a new Geiger-Muller counter have been studied. At Liege, the purification of uranium, the fission products of uranium and their concentration, and the use of the photographic plate in nuclear physics have been investigated. At Louvain, the separation of isotopes, preparation of organic compounds of uranium, nuclear isomerism, and fluorine derivatives of uranium have been studied. At Mons, vacuum pumps, Geiger counters, sources of ions, and electronic apparatus have received attention.

GREAT BRITAIN- Professor M. L. Oliphant, pioneer in atomic energy research, and professor of physics at Birmingham University, recently told the Royal Society of Arts in London he felt confident atomic energy has a very important part to play in the production of industrial power, and that the cost will ultimately be competitive with, and probably much less than, the cost of power from other sources. In speculating on the possibility that the reaction during hydrogen fusion may one day be used as a controllable source of energy, he pointed out that 1-lb. of hydrogen, transformed into helium, would produce about 100 million kilowatt hours of heat energy, or about 130 million horsepower for an hour. He observed that, weight for weight, hydrogen as a nuclear fuel would be about 10 times as good as uranium.

A new firm, Isotope Developments, Ltd., 18, Austin Friars, London, E. C., was recently formed to act as consultants and suppliers of radioactive isotopes, beta gauges, radioactive static eliminators, etc., for industry and agriculture. Mr. R. D. Peters is chairman. Shareholders include British Celanese, Ltd.; Distillers Co., Ltd.; Guest, Keen & Nettleford, Ltd.; Paton & Baldwin, Ltd.; Vickers, Ltd.; and Prudential Assurance Co., Ltd.

BOOKS & OTHER PUBLICATIONS... in the nuclear field...

Geiger-Muller Counters, by Leon F. Curtiss. An elementary treatment of their nature, construction and use. National Bureau of Standards Circular 490. 27 pages, illus.--Superintendent of Documents, Washington 25, D.C. (20¢)

Reports of Atomic Energy Laboratories, issued in January, 1950. Comprise 16 reports in biology & medicine; 23 in chemistry; 1 in engineering; 5 in mineralogy, metallurgy & ceramics; 24 in physics.--Document Sales Agency, AEC, Box 62, Oak Ridge, Tenn.

RADIOISOTOPES...as used for therapy and tracer applications...

The concentration of iodine-131 in thyroid cancer has been investigated at the Sloan-Kettering Institute and Department of Pathology, Memorial Hospital, New York, by P. J. Fitzgerald, F. W. Foote, and R. F. Hill. One hundred consecutive cases of carcinoma of the thyroid from patients who had received tracer or therapeutic doses of radioactive iodine were studied by the radioautographic technique. Evidence of the concentration of the isotope in the carcinoma tissue was present in 46 cases and in 47% of 258 separate lesions. The investigators found that while some follicles showed no activity, morphologically similar, neighboring follicles were heavily laden with iodine-131. They point out that, therapeutically, the lack of homogenous distribution of the isotope in normal thyroid and carcinoma tissues emphasizes the difficulties involved in the calculation of dosage which presumes uniform distribution.

Radioactive colloidal gold (gold-198), recently sent by Abbott Laboratories, Chicago, to Dr. Mario Gaitan-Yanguas, director of the Instituto Nationale de Radium, of Bogota, Colombia, is believed to be the first commercial shipment of radioactive material to South America by a pharmaceutical house in the United States. The radioactive gold, sent by air because of its short half-life of 2.8 days, was for a woman patient in Cali, Colombia, with an ovarian tumor. The Pan-American Sanitary Bureau (Washington office of the U.N.'s World Health Organization) handled details of the shipment, as it is the official procurement office for seven Latin American countries in obtaining radioactive materials from the United States. (In addition to Abbott Laboratories, other U.S. organizations processing and distributing radioactive materials include Tracerlab, Inc., Boston; United States Testing Co., Hoboken, N.J.; Southern Research Institute, Birmingham; and Texas Research Foundation, Renner, Texas.)

IONIZING RADIATION...investigations & notes...

Low temperatures as related to X-ray injuries of the hematopoietic tissues of tadpoles have been studied by Allen, Schjeide, and Hochwald, of the Medical School of the University of California at Los Angeles. The tadpoles were subjected to X-ray treatment of definite dosage, and killed at the end of specific periods of time, during which some were refrigerated and others left at normal temperature. It was found that the temperature of the tadpoles at the time of X-ray treatment makes little if any difference in the destructive processes that develop later. Further, that these destructive effects depend primarily upon the temperature to which the tadpoles are subjected after irradiation.

Mixed fission product contamination from the five atomic bomb explosions at Bikini and Eniwetok Atolls was recently described by the AEC's Dr. Shields Warren, at hearings in Washington. At Bikini, the great mass of sludge near the target center (approx. 500,000 tons), remains moderately active. From the target area, the radiation spreads to the biotic forms about the atoll where it is absorbed and retained. At Eniwetok, the test site island, and the plants and animals on them, contain radioactive fission products. Injury to plants by radiation is observable.

PEOPLE...in atomic energy activities...

Thomas E. Murray, New York business executive and engineer, was nominated last week by President Truman to be a member of the Atomic Energy Commission. He will fill the vacancy created by the resignation Feb. 1st, 1950, of David E. Lilienthal, AEC Chairman, but will not succeed to the Chairmanship.

Dr. Herbert W. Skinner has been appointed temporary head of the theoretical physics division of the Atomic Energy Research Establishment, Harwell (England) to fill the vacancy caused by the removal of Dr. Klaus Emil Fuchs.

Sincerely,

The Staff,
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